DOCUMENT RESUME

ED 069 438 PS 006 195

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TITLE Individual Differences in Infant Responses to Brief, Everyday Separations as Related to Other Infant and Maternal Behaviors.
NOTE 40p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Individual Differences; Infant Behavior; *Insecurity; Parent Child Relationship; Security; *Sensory Deprivation

ABSTRACT

Individual differences in four separation-related behaviors, protest, following, and positive greetings or crying on reunion, were examined for 26 infants observed intensively at home during the fourth quarter-year, and considered in relation to one another, to other infant behaviors, and to maternal behavior. Contrary to Freudian and other hypotheses, separation protest was found to be related positively to maternal unresponsiveness to crying and negatively to maternal sensitivity to signals, while positive greetings had the converse of these relationships. The first factor yielded by a factor analysis seemed to reflect a security-insecurity dimension in an infant's organization of attachment behavior to his mother. The anxious cluster of behaviors included separation prgest and crying on reunion, as well as crying when put down and frequency and duration of crying in general. The secure cluster included positive greetings on reunion and (to a lesser extent) following a separation, as well as positive responses both to being held and being put down. These findings do not yield a picture of simple positive co-variation among attachment behaviors, but rather one of complex patterning with positive co-variation within, but not between, behavioral clusters. (Author)

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INDIVIDUAL DIFFERENCES IN INFANT RESPONSES TO BRIEF, EVERYDAY SEPARATIONS AS RELATED TO OTHER INFANT AND MATERNAL BEHAVIORS[1]

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It is characteristic of the human being, as well as of many other species to be distressed or at least apprehensive when separated from others of his own kind. Even in the first few months of life a human infant is more likely to cry when isolated from social companionship than when in proximity to or in contact with a caregiver (Bell & Ainsworth, in press). During this early period a baby may specifically protest the cessation of physical contact (Ainsworth, Bell & Stayton, 1972) or when a figure goes out of his visual field (Wolff, 1969). At about five or six months of age an infant can discriminate figures across some distance, and may differentially protest the departures of different persons. He is alert to entrances as well as exits, and may positively greet or renew his protest when sighting a returning companion. Furthermore, he differentially protests separation from different people; he is most likely to protest the departure of his mother figure (Stayton, Ainsworth & Main, in press).

PS 006195

Several short-term longitudinal studies have traced the development of separation protest (e.g. Schaffer & Emerson, 1964; Tennes & Lampl, 1964; Ainsworth, 1967; as well as Stayton, Ainsworth & Main, in press). Despite minor differences in age norms, probably attributable to methodological differences, these studies agree essentially in regard to the normative picture of onset and frequency of separation protest. All studies note individual differences, however. Some

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infants seem particularly senstive to separation, and tend to cry frequently when the mother departs even briefly and in the familiar environment of the home, whereas others display little concern at separations in the home environment.

Ainsworth (1967) and Stayton, Ainsworth, and Main (in press) traced the development of following as well as crying as a response to separation and also the development of responses to reunion. Following was a more frequent response than crying in separation episodes in which the baby was unconfined and free to follow. Although most babies seem more likely to follow than to cry, some do both, and some merely cry. Most babies greet the mother happily when she returns, but some protest her return as though chiding her for having been away.

That there are individual differences in these separation-related behaviors is only to be expected. Two questions concern us, here however. How are individual differences in infant behavior associated with differences in maternal behavior? How are these several responses to separation and reunion related to one another and to other attachment behaviors?

Ever since Freud, individual differences in separation protest have been linked with individual differences in maternal behavior. At first he attributed infants' anxiety to 'feeling the loss of the person they love," and suggested that young children who were especially anxious became so either because of a constitutionally excessive sexual instinct or because the mother had given tham too much "petting" (Freud, 1905, p. 224.) Although by 1926 Freud had discarded the theory that anxiety is transformed libido, he reasserted that 'missing someone who is loved

and longed for" is the key to understanding early anxiety (pp. 136-137), and that "spoiling" a young child tends to "magnify the importance of the danger of losing the object" (p. 167.) Benjamin (1963) agreed with Freud that separation protest of high frequency or intensity may be associated with "spoiling" the baby--never leaving him alone and never being able to frustrate his needs. On the other hand, he noted that such responses may also be associated with maternal inability to reduce infant tension.

Schaffer and Emerson (1964) equated the intensity of infant-mother attachment with the intensity of separation protest. They found that those babies who were more intensely attached (i.e. who more strongly protested everyday separations) had mothers who more frequently responded to their crying and who more frequently interacted with them. (Both response to crying and amount of maternal interaction were rated on 6-point scales primarily from maternal report combined with some direct observation.)

From her observation of Ganda infants, Ainsworth (1967) came to another conclusion: intensity of separation protest is a misleading index of the strength of infant-mother attachment. Those infants who displayed most protest in everyday separation situations tended to be those whose attachment relationships were of insecure or anxious quality. Moreover, the mothers of such children tended to give them less rather than more time and attention than did the mothers of less protesting, less anxious babies. Separation protest, if differential, may well be taken as a clear indication that an attachment relationship has been

formed, but absence of such protest in everyday, nonstressful situations does not necessarily suggest that an attachment is either absent or weak.

Tennes and Lampl (1966), on the basis of observations of infants in both home and clinic, concluded that "the best predictors of separation intensity are the mother's inhibition of aggression in the child and her hostility toward the child." Bowlby (in press), after having reviewed the relevant theoretical and research literature, concluded: "...it is found, probably invariably, that a child's heightened anxiety over separation and loss of love is a reaction not to any real 'excess of parental affection' but to experiences of an almost opposite kind."

Are separation protest and anxiety related to an "excess" of or at least above average maternal responsiveness and interaction as Freud, and Schaffer and Emerson suggested, or are they related to anxious interaction and/or hostility and rejection as Bowlby, Ainsworth, and Tennes and Lampl proposed? Or are they associated both with "spoiling" through maternal overresponsiveness and with tension-maintaining through unresponsiveness as Benjamin concluded?

How might the several separation-related behaviors be expected to correlate with each other and with other attachment behaviors? There are two sets of conflicting theoretical expectations. According to the concept of attachment as proposed by Bowlby (1969, and in press) and Ainsworth (1967, 1972) there is no reason to expect that all attachment behaviors should be positively correlated, but rather there should be individual differences in the way attachment behaviors are organized together as they become directed toward a specific attachment figure.

According to others (e.g. Maccoby & Feldman, 1972, Coates, Anderson, & Hartup, 1971; and Blurton Jones (1972) the concept of attachment requires for validity significant positive covariation of all its component behavioral indices.

Bowlby (1969, pp. 181-182) points out that in most species there is more than one kind of infant behavior that has the common outcome of infant and mother maintaining a degree of proximity to each other. Because of this common "predictable outcome" it is useful to use a general term to cover them all, and that term is "attachment behavior." As such, attachment behavior is similar to terms such as "fear behavior," "reproductive behavior," "eating behavior" and "nest-building behavior." There is no a priori reason to expect behaviors classed together on the basis of common end result to be correlated positively. Indeed, one would expect sucking and chewing to be negatively correlated. Similarly, two behaviors classed as fear behavior--fleeing and freezing--should be negatively correlated.

PS 006195

It has been our contention (Ainsworth, 1963, 1967, 1972, and in press; Ainsworth, Bell & Stayton, 1972) that by the last quarter of the first year nearly all family-reared infants have become attached to their mothers and/or a few other figures, and that in each case the various component attachment behaviors have become organized together in different configurations. Real-life experience is believed to be crucially influential in shaping this idiosyncratic organization. Our previous work identified security-insecurity as one dimension in terms of which individual differences in the organization of attachment behaviors might

usefully be ordered. Bowlby (in press) has assembled evidence of the role played by separation anxiety in anxious versus secure attachment. Because of these considerations we expected to find separation protest to be correlated positively with other attachment behaviors reflecting insecurity and negatively correlated with others, such as happy greetings on reunion, that seem to reflect a more secure attachment relationship.

The dependency paradigm formulated by social-learning theorists held that a dependency drive might be assumed if it were found that dependency behaviors were significantly and positively correlated. On the whole, the various behaviors assumed to reflect dependency have been found to have relatively low inter correlations (Maccoby & Masters, 1970), and such findings have led some to be discontented with the concept of a generalized dependency drive (e.g. Sears, 1963.) The same kind of argument has been raised in the context of attachment (e.g. Coates, Anderson & Hartup, 1971; Maccoby & Feldman, 1972.) According to this argument, diverse attachment behaviors such as smiling, crying, approaching, clinging, vocalizing, looking, and so on, should be found to covary if the concept of attachment is a valid one. It is as though they considered attachment a construct like a "trait" which may be measured by a variety of behavioral indices. For the measures of the construct to be valid significant positive correlations between them must be demonstrated. Thus Blurton Jones (1972) stated that measures of attachment should covary if they are in fact measuring the same "thing." Elsewhere (1972) Blurton Jones and Leach said "Ethologists, asking themselves what they mean by words like 'attachment', find that

the only use for such a term is as shorthand for a number of behaviour items which vary together, or are found to be related together in a more complex way in a causal system." (Italics ours.)

Do separation protest, following, and different types of greeting behavior covary with each other and with other attachment behaviors in such a way that one might consider attachment a trait the strength of which can be measured by its component behaviors, or a drive or need similarly differing in strength? Or do different clusters of attachment behaviors seem positively linked to each other but negatively correlated with other clusters, as our concept of differing organizations of the attachment relationship would suggest?

In the present study we explored individual differences in infant responses to everyday separation and reunion with these issues in mind. The developmental trends of these behaviors are reported elsewhere (Stayton, 1971; Stayton, Ainsworth & Main, in press.) In the present report individual differences have been examined in several ways. First, findings will be presented relevant to the stability of these behaviors in everyday home situations across the second, third, and fourth quarters of the first year. Second, the interrelationship of these separation-related behaviors and measures of maternal behavior in the infant's fourth quarter will be examined. Finally, the interrelations of these fourth-quarter separation behaviors with each other and with other infant attachment behaviors will be examined to see if they tend to covary or to cluster.

Method

A fuller description of the subjects, and observational and coding procedures has been provided elsewhere (Stayton, Ainsworth & Main, in press). Here we shall present only a summary.

Subjects

The subjects were 26 infant-mother pairs from white, middle-class families. Sixteen infants were boys; 10 were girls. Six of the boys, but none of the girls, were first born. Two of the mothers had full-time employment--one from the infant's fourth month of life, and one from the infant's eleventh month. In addition, four mothers had part-time employment for short periods of the infant's first year.

Observations and Records

The subjects were visited at home in the course of four-hour visits at three-week intervals throughout the infant's first year of life. The visitor-observer made a detailed narrative report of the behavior of the baby and his interaction with his mother and others.

Coding and Behavioral Measures

The narrative reports from 15 to 54 weeks of age were coded for each instance when the mother left or entered a room in which the baby was situated. The behavioral measures derived from the leave- and enter-room codings are as follows:

Infant crying when mother leaves room (Crying L/R). Crying included the range of behaviors from a silent cryface to loud, prolonged crying, and was measured as the percentage of its occurrence in all mother-leaves-room episodes.

Infant following when mother leaves room (Following L/R). Following was scored only after a baby had acquired locomotor ability and only when he was on the floor and free to follow. A baby judged to have followed only if he went the full distance necessary to get into visual range of his mother, or at least as far as a barrier that prevented him from going farther. Following was expressed as a percentage of its occurrence in such mother-leaves-room episodes.

Infants' positive greetings when mother enters room (Positive greeting E/R). Examples of positive greetings are as follows: smiling, laughing, pleasant vocalizing, bouncing, waving arms, reaching, and approaching. The measure was the percentage of occurrence of such positive greetings in all mother-enters-room episodes.

Infants' crying or mixed greeting when mother enters room (Crying and Mixed E/R). This measure included those instances when a baby initiated crying, or if already crying, increased the intensity of his crying upon his mother's entrance. It also included those instances in which crying was mixed with some positive greeting of the mother, e.g. crying and reaching. Since both types of responses were rare, a combined measure was used--the percentage of crying and mixed greeting in all mother-enters-room episodes.

Maternal acknowledgement of the infant upon entering room (Acknowledgement E/R). This measure refers to any positive social behavior that a mother directs toward her baby immediately upon entering the room, such as smiling, talking pleasantly, giving the baby a toy, or picking him up. (The initiation of routines such as feeding or changing was not included here.) The measure is expressed as a percentage of occurrence of

acknowledgement in all mother-enters-room episodes.

Frequency of mother-leaves-room episodes (Frequency L/R). This is a measure of the frequency per infant's waking hour of mother leaving the room.

In addition to the above measures specific to leave- and enter-room episodes, a number of measures were borrowed from other analyses in order to compare separation-related behaviors to other infant behaviors and to examine their relationship with maternal behaviors. The measures used in these analyses refer to the fourth quarter only, and are based on all visits made to the home when the infant was from 39 to 54 weeks old.

The following measures were borrowed from an analysis of infant crying, and are described in detail elsewhere (Bell & Ainsworth, in press).

Frequency of episodes of infant crying: the number of crying episodes per infant's waking hour.

Duration of infant crying: minutes per waking hour that an infant cries.

Maternal ignoring of episodes of crying: the percentage of infant crying episodes that are altogether ignored by the mother.

Duration of maternal unresponsiveness to crying: the minutes per waking hour that an infant cries without a response from his mother.

The following measures were borrowed from an analysis of behavior related to physical contact with the mother, and are described in more detail elsewhere (Ainsworth, Bell & Stayton, 1972).

Infant's positive response to being held (Positive to holding): the percentage of mother-picks-baby-up episodes in which a baby responded with

active contact behaviors such as embracing, exploring the mother's face or body, burying his face against her, and "sinking in", or in which he responded with expressions of delight more intense than mere smiling.

Infant's negative response to being held (Negative to holding); the percentage of mother-picks-baby-up episodes in which a baby responded by beginning to cry or resisting contact by squirming, stiffening, pushing away, hitting or biting.

Infant stops crying when picked up (Stop cry on P/U): the percentage of mother-picks-baby-up episodes in which a baby, already crying, stopped crying.

Infant's positive response to being put down (Positive to P/D): the percentage of mother-puts-baby-down episodes in which a baby smiled or otherwise seemed content when contact ceased.

Infant's negative response to being put down (Negative to P/D): the percentage of mother-puts-baby-down episodes in which a baby cried, fussed, or made a clear gesture that he wished to be picked up again.

Infant initiations of being picked up (Initiation of P/U): the percentage of mother-picks-baby-up episodes preceded by a baby's approach, clambering up, or reaching.

Infant initiations of being put down (Initiation of P/D): the percentage of mother-puts-baby-down episodes in which a baby squirmed, pushed away, or otherwise indicated that he wanted to be put down.

In addition to the maternal measures derived from detailed coding of leave- and enter-room episodes, and of crying episodes, four scales[4] were used to rate the quality of a mother's interaction with her baby. These were 9-point rating scales, with the anchor points of 9, 7, 5, 3, and 1

being defined in detail. The behavioral descriptions of the extreme poles will be summarized here.

Sensitivity-insensitivity. The sensitive mother is defined as one who is finely attuned to her baby's signals and communications, and able to see things from his point of view. She is aware of infant signals, interprets them accurately, and responds to them promptly and appropriately. The insensitive mother is geared almost exclusively to her own wishes, moods, and activities. Her interventions tend to be prompted by signals within herself and therefore are rarely contingent upon her baby's signals.

Accessibility-ignoring. The accessible mother's attention is nearly always tuned in to her baby so that she can perceive his signals and communications both when he is near and when he is in another room. The inaccessible mother is often so preoccupied with her own thoughts and activities that she does not even notice her baby, let alone acknowledge his signals.

Acceptance-rejection. An accepting mother is one who is judged to accept almost all aspects of her baby and his behavior, including those that other mothers may find hurtful or distasteful. She also accepts the responsibility of caring for him without chafing at the temporary restriction of her usual interests and activities. A rejecting mother may have positive feelings about her baby but they are frequently overwhelmed by anger or resentment--which she may evince openly or display less overtly in her behavior toward him and her comments about him.

Cooperation-interference. A cooperative mother avoids imposing her will on the baby, but rather arranges his environment and her schedule so as to minimize any need to interrupt or control him. When she intervenes she is adept at "mood setting" which helps him to accept her wishes

or control as something congenial to him. An interfering mother does not consider her baby as a separate person whose activities and wishes have a validity of their own. She seems to assume that she has a perfect right to do with him what she wishes, imposing her will on his, shaping him to her standards, and interrupting him arbitrarily without regard for his moods, wishes, or activity-in-progress.

Mothers were rated on these four scales by two or more independent judges on the basis of the narrative report of each home visit made in the fourth quarter of the infant's first year. The final conferenced rating for each mother was nearly always the median of the ratings of the separate visits done by the separate judges. Inter-rater agreement for sensitivity-insensitivity was .89; for accessibility-ignoring, .87; for acceptance-rejection- .88; and for cooperation-interference, .86.

Results

Stability of Separation-related Behaviors

Table 1 shows the intercorrelations of crying when the mother leaves the room, positive greetings, and crying and mixed greetings when she returns for the second, third, and fourth quarters in order to assess their stability from the time of onset throughout the rest of the first year. The first quarter was not included in this analysis since too few infants displayed these behaviors during the first few months. Following when the mother leaves is not included in this analysis since in most infants it did not occur frequently until the fourth quarter.

Insert Table 1 about here

Crying when the mother leaves the room in the second quarter is not significantly correlated with similar behavior in the third or fourth quarters, although there is a significant positive correlation between third- and fourth-quarter behavior. Thus separation protest does not seem to become a fairly stable individual characteristic until the second half of the first year. Positive greetings to the mother when she enters the room, on the other hand, seems fairly stable throughout the second, third, and fourth quarters. The intercorrelations among quarters for crying and mixed responses to the mother's entrance are positive but not significant.

Interrelations between Separation and Greeting Behaviors and Maternal Behavior

First let us consider the intercorrelations among the fourth-quarter measures of maternal behavior themselves. These are shown in Table 2. It may be seen that the four measures based on ratings (sensitivity-insensitivity, accessibility-ignoring, acceptance-rejection, and cooperation-interference) are highly and positively correlated. The two measures of maternal response to infant crying (number of episodes of crying ignored by the mother and duration of maternal unresponsiveness to crying) are negatively correlated with the rated measures of maternal behavior.

Insert Table 2 about here

The frequency with which a mother acknowledges her infant when entering the room is positively and substantially correlated with the four rated measures. The frequency with which a mother leaves the room is negatively

correlated with maternal acceptance-rejection and cooperation-interference, and positively correlated with the number of crying episodes that the mother ignores. In summary, mothers who are relatively sensitive to a baby's signals, accessible, accepting, and cooperative are less likely than others to be unresponsive to his crying, and more likely to acknowledge him when she returns after a brief absence. Mothers who are relatively rejecting and interfering tend to leave the room more frequently than others.

Table 3 presents the intercorrelations of fourth-quarter infant separation and greeting behaviors with measures of maternal behavior.

Insert Table 3 about here

It may be seen that crying when mother leaves the room is positively and significantly correlated with maternal ignoring of crying and duration of maternal unresponsiveness to crying; it is negatively related to maternal sensitivity to infant signals and communications. Following the mother when she leaves is positively related to maternal accessibility, and to her sensitivity to signals. Positive greeting to the mother when she enters the room is positively related to maternal acceptance, cooperation, and sensitivity to signals, and negatively related to maternal ignoring of and delay in responding to crying. Although crying and mixed responses to mother's entrance are not significantly correlated with any of the maternal variables, the direction of the correlations is identical with crying when mother leaves the room, and in each case opposite to positive greeting when mother enters the room. There is no significant correlation between separation-related infant behaviors and

either the frequency with which a mother leaves the room or the consistency with which she acknowledges her baby on her return.

To sum up, a mother who is insensitive to her baby's signals in general and who is unresponsive to his crying in particular is likely to have a baby who more frequently than others protests her departures in the familiar environment of the home. A mother who is psychologically accessible and sensitive to signals is likely to have a baby who follows her when she leaves rather than protesting her departure. A mother who is accepting, cooperative, and sensitive to signals is likely to be greeted cheerfully by her baby when she returns after an absence, whereas a mother who is unresponsive to crying and indeed insensitive to infant signals generally is less likely to receive a positive greeting.

Separation and Greeting Behaviors and Other Experiential Variables

Robertson and Bowlby (1952; Bowlby, 1953) reported that a major separation (that is, one that lasts days or weeks rather than mere minutes or hours) may sensitize a young child to separation so that for some days or weeks following such an experience he is more likely to protest even minor everyday separations in the familiar home environment. Furthermore, Bowlby (in press) suggests that the same effect may occur as a result of repeated, long, everyday separations. Therefore, the infants in our sample were divided into two groups--those who had experienced either a major separation or recurrent separations, and those who had not. The "major" separations ranged from 4 days to 1 month, and included separations for a baby's hospitalization, a mother's hospitalization, or parents' vacation. Separations were not included

that occurred before onset of differential protest upon the mother's leaving the room. The range of ages of the separations included in this analysis was from 24 to 42 weeks. Except for one case in which a baby was hospitalized for minor surgery, all of the separation environments were non-institutional--the homes of relatives or neighbors. Recurrent separations were those occasioned by a mother working. These separations occurred at various ages, but all implied a relative or other regular substitute caregiver looking after the baby at home during mother's absence. Only two mothers worked full-time--one beginning when the baby was 3 months old, and the other not until the baby was 10 months old.

No difference in separation protest was found between the group of 5 infants whose mothers worked and the group of 6 infants who had "major" separations. Therefore the two groups were combined and compared with the group of 15 infants who had experienced neither major separations nor frequent recurrent separations. The separated babies cried somewhat less when the mother left the room in the fourth quarter ($X = 19.3\%$) than did the non-separated babies ($X = 24.8\%$), but this difference was not significant ($t = 1.52$, $p > .05$). There was such a confounding of the relevant variables (age of separation, length of separation, and quality of substitute mothering during separation) that our negative findings should not be taken too seriously. Even though this finding were to prove valid in a better controlled study of major or long daily separations in the first year, it would not rule out the possibility that separation experiences do not sensitize a baby to respond more anxiously to the threat of future separation until the second year of life, or perhaps later.

Two other "experiential" variables that were tested were (a) the mean number of people present during a home visit, and (b) the amount of floor freedom a baby was permitted after he had acquired locomotion. There was no significant correlation between any of the separation-related behaviors and number of people present during a visit. Thus there seemed no tendency for babies who commonly had their mothers to themselves to cry or follow more frequently when mother left the room. Similarly there was no relationship between the separation-related behaviors and the amount of floor freedom permitted to a baby. Babies accustomed to floor freedom did not follow their mothers significantly more or less frequently than babies who were usually confined.

Interrelations among Separation and Greeting Behaviors

Table 4 shows the intercorrelations of all the infant behavioral measures for the fourth quarter. It may be seen that crying when the mother leaves is positively and substantially correlated with crying and mixed greeting when she returns. Following is positively correlated with positive greeting, and negatively correlated to crying when mother leaves--although the latter coefficient is somewhat short of the .05 level of significance. Positive greetings are negatively correlated both

Insert Table 4 about here

with crying when mother leaves and crying when she enters. Thus, an infant who cries relatively frequently when his mother leaves is likely to be one of those who cry when she returns. Further, there is a tendency for a baby who cries when his mother leaves not to follow her. On the

other hand, an infant who tends to follow but not to cry when mother leaves, tends to greet her cheerfully when she returns.

Interrelations of Separation and Greeting Behaviors with Other Behaviors

It may also be seen in Table 4 that the measures of infant crying are significantly correlated with three of the four separation-related behaviors. Babies who cry much, more frequently than those who cry little, tend to protest the mother's departure and to cry when she returns. Babies who cry relatively little tend not to protest mother's leaving the room but give her a positive greeting when she returns. Neither of the crying measures was significantly correlated with following.

Behaviors related to physical contact with the mother do not appear to be significantly related to separation and greeting behaviors, except that there is a negative correlation between crying when the mother leaves and a positive response to being put down, and a positive correlation between positive greetings and a positive response to being held. (The intercorrelations among behaviors related to physical contact are themselves of interest, but will not be considered until later.)

A factor analysis of the 13 infant variables in Table 4 was undertaken further to clarify the interrelations between them. Harmon's Minres procedure was used with a Varimax rotation. The two factor solution is presented in Table 5. It is acknowledged that it is not usual to use multivariate techniques with a sample as small as the present one. But it is unusual also for a small sample to yield so many significant and substantial intercorrelations of behavioral measures as this one has done. It seems likely that the many hours of observation made possible

by long and frequent home visits yielded measures more dependable and more closely reflecting stable behavioral characteristics than is usually the case. Because of these considerations, and because of the structure of the correlation matrix itself, a factor analysis seemed both justifiable and desirable.

Insert Table 5 about here

The highest loading on Factor I was found for crying when the mother leaves the room, with a positive loading of .875. Other variables with substantial positive loadings are frequency and duration of crying, and crying and mixed greeting when mother enters the room. Negative response to being put down is also loaded positively. Variables with substantial negative loadings are positive greetings to mother when she enters the room and positive response to being put down. Positive response to being held is also loaded negatively. We are inclined to interpret Factor I as representing an insecurity-security dimension of the infant-mother attachment relationship. At its positive pole this factor seems to reflect a baby's anxiety about his mother's accessibility and responsiveness. This interpretation will be discussed more fully in a later section.

Factor II is clearly related to response to physical contact. The measure with the highest loading is negative response to being held--crying, stiffening, squirming, or an even more aggressive resistance to contact with the mother--which has a loading of .631. Initiation of being put down (also involving squirming and resistance) also has a high positive loading. Although duration of crying has a fairly substantial positive

loading on Factor II, none of the separation or greeting behaviors have significant loadings on this factor. The measure with the highest negative loading is stopping crying when picked up, which, of course, reflects a capacity to be comforted by physical contact with the mother; the loading is -.635. Other variables with high negative loadings are initiation of being picked up (by approaching, reaching, or clambering) and positive reponse to being held (with active contact behaviors such as embracing, scrambling over the mother, or sinking in against her body). Positive response to being put down has a moderate negative loading on Factor II, although it seems more closely related to Factor I. It seems likely that Factor II reflects the degree of distress or ambivalence versus enjoyment an infant experiences in physical contact with his mother. It could, however, reflect ambivalence versus enjoyment of mere interaction with the mother. Since no measures of distance interaction are represented in the correlation matrix, the interpretation of this factor must remain equivocal until further data analysis has been completed.

Discussion

By the fourth quarter of the first year it may be assumed that there is a substantial degree of stability of individual differences in behaviors related to everyday separation and reunion situations in the familiar home environment. This assumption cannot rest, however, on the modest evidence of stability shown by the cross-quarter correlations in Table 1. Although some of the correlations are significant for crying when mother leaves the room and for positive greetings, there is no evidence

of cross-quarter stability for crying and mixed greetings or for following, and, furthermore, even the significant correlations are low enough to suggest that substantial changes are taking place throughout the second and third quarters. To what extent these are orderly developmental changes related to individual patterns of organization of attachment behavior can be determined only by a detailed longitudinal analysis yet to be undertaken. Nevertheless, the substantial intercorrelations among the four classes of separation-related behaviors in the fourth quarter suggest that by that quarter they must have achieved a fairly high degree of stability. The intercorrelations among these behaviors, and between each of them and other infant behaviors, form a complex matrix of both positive and negative correlations that suggest clusterings of behaviors and support our hypothesis that by the end of the first year different infants have organized attachment behavior directed toward the mother figure in different ways.

The intercorrelations of infant behaviors with one another and their correlations with infant behaviors suggest that there is an insecurity-security dimension of the infant-mother attachment relationship, and this is reflected in Factor I of the factor analysis. The pattern of behaviors that suggests an anxious or insecure attachment relationship includes frequent protest in separation situations in the home environment, protest again on reunion, protest on cessation of contact, and frequent and prolonged crying in general. The fact that crying when the mother leaves the room received the highest positive loading of .875 suggests that this entire cluster of behavioral characteristics is related to an infant's

anxiety about his mother's whereabouts and accessibility. It also confirms Freud's proposition that the key to early anxiety is, 'missing someone who is loved and longed for.' The pattern of behaviors that reflect a secure attachment relationship consists of infrequent protest on separation, happy greeting on reunion, infrequent and brief crying, and a tendency happily to accept the cessation of physical contact. The implication is that the securely attached baby has confidence in his mother's accessibility and responsiveness.

The correlations of separation and reunion behaviors with measures of maternal behavior show that frequent separation protest is significantly related to maternal unresponsiveness to crying and to maternal insensitivity to infant signals generally. The fact that frequency and duration of crying in general have high positive loadings on Factor I throws further light on the development of an infant's distrust in his mother's accessibility. Bell and Ainsworth (in press) have shown that the amount of infant crying is significantly and positively related to the history of maternal ignoring of crying episodes and delay in responding to crying. It seems likely that a baby's confidence in his mother's accessibility and responsiveness is built up in the course of his first year largely through his mother's consistency and promptness in responding to his signals, including his crying, and that infants who are chronically anxious about their mother's whereabouts are those whose crying signals have often fallen on deaf ears. The securely-attached baby, on the other hand, because his mother has been responsive to his signals, has built up expectations that his mother, even though absent, would be

accessible if searched for, responsive to signals across a distance, and reliable in returning within the time span of absences to which he has become accustomed. Because he does not feel abandoned by her when she leaves the room, he tends to protest neither when she departs nor when she returns, but instead gives her a happy greeting on reunion. He can cheerfully accept cessation of contact because he is confident that his mother will be accessible to him if he needs her.

The anxious cluster of behaviors tends to be related negatively both to enjoyment of physical contact and to acceptance of being put down. There is no evidence that infants who respond positively to holding are clingy or "spoiled"; they are more likely to accept being put down than they are to protest it. On the other hand, infants who respond negatively to physical contact tend both to seek to be put down and protest when they finally are put down. Ainsworth, Bell, and Stayton (1972) reported that positive responses to being held and to being put down are associated with the following maternal behaviors: picking the baby up merely to show him affection, holding him for relatively long episodes especially in non-routine contexts, and holding him tenderly. Mothers who pick their babies up frequently (but who hold them for relatively short periods at a time) tend to have babies who protest being put down and who do not respond positively to being held. Such mothers tend to be abrupt and interfering in their pick ups rather than affectionate and tender.

These findings give no support either to Freud's early (1905) or to his later (1926) hypothesis. There is no implication in our findings that much affectionate physical interaction between a mother either "spoils" him or makes him prone to separation anxiety. They do, however, support Benjamin's (1963) second hypothesis that frequent separation protest is associated with maternal inability to reduce infant tension, in that separation protest is significantly linked both to amount of infant crying and to maternal unresponsiveness to crying.

The present findings do not confirm Schaffer and Emerson's (1964) findings that intensity of separation protest is associated positively with maternal responsiveness to crying. Their measure of intensity was based largely on frequency of protest. We found that the frequency of separation protest was positively associated with maternal unresponsiveness to crying. This discrepancy between two longitudinal studies is puzzling, but it seems likely that it is due to methodological differences. Our messure of separation protest was frequency of crying when the mother leaves the room, whereas leave-room episodes constituted but one of Schaffer's and Emerson's separation situations. Since they lumped together ratings of seven types of separation situations into one final rating, it is impossible to ascertain whether any one of these yielded findings congruent with ours. Our measures of separation protest and maternal responsiveness to crying were based on detailed coding in prolonged observational sessions; theirs were ratings based primarily upon interview information, with direct observation playing only a confirmatory role. Since their developmental account of separation protest did not differ substantially from ours (Stayton, Ainsworth, & Main, in press),

however, we are inclined to attribute the discrepancies in findings to differences in the measures of maternal behavior. It seems unlikely to us that a mother can give an account of her own behavior that is dependable in regard to a matter as sensitive as her responsiveness to her infant.

Our findings lend some support to Tennes and Lampl's (1966) conclusion that separation anxiety is related to maternal hostility. We find that maternal acceptance (i.e. absence of hostility and rejection) is positively related to happy greetings on reunion and negatively (although not significantly) related to separation protest. (We are unable to confirm their conclusion that separation protest is related to maternal behavior inhibiting infant aggression for we have no measure of such behavior.) Since our findings suggest that rejecting mothers tend also to be insensitive to infant signals and unresponsive to infant crying it is difficult to disentangle the effects of hostility from those of unresponsiveness. It seems likely, however, that both kinds of maternal behavior contribute to an infant's anxiety about his mother's accessibility and responsiveness.

Thus, in summary, the present study yields evidence that maternal unresponsiveness to infant signals fosters the development of an anxious infant-mother attachment relationship, characterized by much crying and by a relatively high frequency of protest in everyday separation situations. Maternal sensitivity and responsiveness to signals, on the other hand,

rather than 'spoiling' the baby, fosters the development of a secure attachment relationship, characterized by relatively low frequency of separation protest and high frequency of happy greetings in the familiar home environment. These findings fit very well with the evidence that Bowlby (in press) has assembled to support his proposition that real-life experiences have a profound influence on the incidence of separation protest and in the etiology of anxious attachment.

Throughout this discussion we have emphasized the fact that all these findings and the relationships between them pertain to everyday separation situations in the familiar home environment. When separated from his mother, even briefly, in an unfamiliar environment one-year-olds commonly protest (Ainsworth & Bell, 1970), and securely attached babies, who infrequently protested separation at home, are very likely to protest vigorously when mother leaves them in a strange situation (Ainsworth, Bell & Stayton, 1971.) Furthermore, studies of major separations that last for days or even months in no way suggest that intensity of separation distress is related to a previously anxious relationship with the mother (e.g. Ainsworth, 1962.) On the contrary, an involuntary and prolonged separation in an unfamiliar environment tends to shatter the trust of even a previously secure young child in the accessibility of his attachment figure.

Following has been given less attention in our discussion than other separation-related behaviors, despite the fact that it has been found to be more likely to occur than protest in response to separation. Although our findings suggest that following may be fostered by maternal accessibility and sensitivity to signals, and although following is positively correlated with positive greetings on reunion, our factor analysis does not link

following clearly to a security-insecurity dimension in the organization of attachment behaviors. To be sure, following ranges qualitatively from a cheerful gravitating in mother's direction to frantic pursuit accompanied by crying, but our frequency measure did not distinguish between these. Both securely and anxiously attached infants follow. Following constitutes active proximity seeking, in distinction to the proximity-promoting signalling implicit in crying and in many instances of greeting behavior. We do not believe that our present findings should be interpreted to minimize the significance of following as an attachment behavior in the last quarter of the first year--and following undoubtedly becomes more important in the second year when the baby is less frequently confined. Our findings merely indicate that it seems less clearly related to the security-insecurity dimension of the attachment relationship and to separation anxiety than are crying on separation and the kind of greeting given upon reunion.

Finally, let us consider the question of covariation versus patterning of infant attachment behaviors. Our matrix of intercorrelations of infant behaviors and the factor analysis thereof makes it abundantly clear that the behaviors that we have classed as attachment behaviors do not all covary positively. We may conclude that attachment is neither a generalized drive nor a unitary trait--but then attachment was originally conceived as neither. Attachment consists of the organization of a variety of separate behaviors that have the common end result of promoting and maintaining proximity and interaction with a specific figure. Disparate

behaviors that tend to be incompatible at any one time (such as smiling and crying), and perhaps negatively correlated in terms of the relative frequency with which different individuals display them, may be viewed as alternative means to a common end. The paradigm of construct validity, so pertinent to trait measurement, seems no more applicable to attachment behavior than it is to fear behavior or to food intake.

On the other hand there is ample evidence of the patterning of infant attachment behaviors. Although they do not covary, these behaviors do not have a random zero correlation. On the contrary, they yield a complex but intelligible matrix containing many substantial positive and negative correlations. In Blurton Jones's terms, they are related together in a causal system in a more complex way than simple covariation. The evidence of patterning supports our hypothesis that although all infants begin with a common repertoire of precursor attachment behaviors, by the end of the first year they have organized them in different ways. And although it is reasonable to suppose that there are genetically-based differences in the "strength" of the original behaviors, there is ample evidence to support the proposition that real-life experiences, especially experiences in relations with the mother figure, crucially influence the shape that the individual organization of behaviors toward that figure eventually assumes.

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Footnotes

1. An earlier and briefer version of this paper was presented at the biennial meeting of the Society for Research in Child Development, at Minneapolis, Minnesota, April 1971, in a symposium entitled 'Developmental changes in some attachment behaviors in the first year of life'. The research has been supported by grants 62-244 of the Foundations Fund for Research in Psychiatry and RO1 HD 01712 of the United States Public Health Service, and by the Grant Foundation; this support is gratefully acknowledged. We also wish to thank Barbara A. Wittig, George D. Allyn, and Robert S. Marvin II, who carried out many of the observations; and Nelson Bingham, Inge Bretherton, Robert Dorr, Paul Giblin, James Koch, Rick Lieberman, Eleanor McCulloch, and David Olds, who coded the observations.
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4. The sensitivity-insensitivity scale is published in Ainsworth, Bell & Stayton, in press. Copies of the other scales may be obtained from: Mary D. S. Ainsworth, Department of Psychology, The Johns Hopkins University, Baltimore, Maryland 21218.

Table 1

Stability of Separation-related Behaviors

Separation-related behaviors	2nd & 3rd quarters	2nd & 4th quarters	3rd & 4th quarters
Crying L/P	.23	-.15	.41*
Positive greeting P/R	.37	.40*	.40*
Crying & mixed E/P	.34	.18	.20

* $p < .05$

Table 2

Intercorrelation of Maternal Variables

Maternal variables	1	2	3	4	5	6	7
1. Sensitivity-insensitivity	....						
2. Accessibility-ignoring	.82**	....					
3. Acceptance-rejection	.89**	.74**	....				
4. Cooperation-interference	.86**	.58**	.88**	....			
5. Unresponsiveness to crying/duration	-.58**	-.42*	-.46*	-.49*	....		
6. Ignores crying/episodes	-.41*	-.36	-.37	-.43*	.54**	....	
7. Acknowledgement E/B	.60**	.54**	.52**	.48*	-.34	-.17	....
8. Frequency E/B	-.29	-.02	-.39*	-.46*	.23	.43*	-.15

* $p < .05$
** $p < .01$

Table 3

Intercorrelation of Separation-related Behaviors and Maternal Variables

(Fourth Quarter)

Maternal variables	Separation-related behaviors			
	Crying L/R	Following L/P	Positive greeting E/R	Crying & mixed E/P
Sensitivity-insensitivity	-.40*	.40*	.46*	-.28
Accessibility-ignoring	-.26	.48*	.30	-.07
Acceptance-rejection	-.27	.22	.50**	-.34
Cooperation-interference	-.23	.16	.49*	-.32
Unresponsiveness to crying/duration	.46*	-.10	-.40*	.35
Ignores crying/episodes	.45*	-.03	-.42*	.34
Acknowledgement E/R	-.10	.08	.21	-.03
Frequency L/R	.14	.05	-.31	.35

* $p < .05$
** $p < .01$

Table 4

Intercorrelations among Infant Behavioral Variables in the Fourth Quarter

Infant behavioral variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Crying L/P	....											
2. Following L/P	-.339	.....										
3. Positive greeting E/R	-.460*	.417*	....									
4. Crying & mixed E/P	.577**	-.142	-.512**	....								
5. Frequency of crying	.561**	-.067	-.488*	.418*	....							
6. Duration of crying	.573**	-.138	-.479*	.515**	.663**	....						
7. Positive to holding	-.203	.089	.389*	-.135	-.409*	-.570**	....					
8. Negative to holding	.158	-.066	-.369	.207	.459*	.509**	-.377	....				
9. Stops cry on P/U	.0087	.356	.316	-.093	-.100	-.267	.399*	-.460*	....			
10. Positive to P/D	-.387*	.262	.301	-.344	-.603**	-.528**	.381	-.295	.343	....		
11. Negative to P/D	.249	.035	-.185	.198	.398*	.338	-.389*	.050	-.051	.596**	....	
12. Initiation of P/U	.129	.250	.046	.026	-.021	-.259	.417*	.290	.341	.382	-.247	....
13. Initiation of P/D	.058	.032	-.248	.106	.412*	.394*	-.250	.645**	-.346	-.484*	-.070	-.301

* $p < .05$
** $p < .01$

Table 5

Factor Analysis of Fourth-Quarter Infant Behavioral Variables

Infant behavioral variables	Factor I	Factor II	Communality
1. Crying L/R	.875	-.171	.795
2. Following L/R	-.234	-.156	.079
3. Positive greeting E/R	-.593	.252	.415
4. Crying & mixed E/R	.661	-.001	.436
5. Frequency of crying	.733	.280	.616
6. Duration of crying	.719	.427	.669
7. Positive to holding	-.344	-.541	.411
8. Negative to holding	.277	.631	.475
9. Stops cry on P/U	-.059	-.635	.407
10. Positive to P/D	-.534	-.489	.524
11. Negative to P/D	.379	.177	.175
12. Initiation of P/U	.022	-.596	.356
13. Initiation of P/D	.180	.605	.399
Variance accounted for	33.24%	24.63%	57.87%

Chi-square for significance of factors = 76.37 with 66 d.f.

Abstract

Individual differences in four separation-related behaviors--protest, following, and positive greetings or crying on reunion--were examined for 26 infants observed intensively at home during the fourth quarter-year, and considered in relation to one another, to other infant behaviors, and to maternal behavior. Contrary to Freudian and other hypotheses, separation protest was found to be related positively to maternal unresponsiveness to crying and negatively to maternal sensitivity to signals, while positive greetings had the converse of these relationships. The first factor yielded by a factor analysis seemed to reflect a security-insecurity dimension in an infant's organization of attachment behavior to his mother. The anxious cluster of behaviors included separation protest and crying on reunion, as well as crying when put down and frequency and duration of crying in general. The secure cluster included positive greetings on reunion and (to a lesser extent) following on separation, as well as positive responses both to being held and to being put down. These findings do not yield a picture of simple positive co-variation among attachment behaviors, but rather one of complex patterning with positive co-variation within, but not between, behavioral clusters.